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Science and Technology Perspectives

DEVELOPMENTS

Supercomputers

(Japan) Hitachi has developed a single processor for its new S/820-80 supercomputer that attains 3 billion floating-point operations per second. This is significantly higher than the speeds of processors manufactured by NEC and Fujitsu, which operate at 1.3 billion and 1.1 billion operations per second respectively. Deliveries of the Hitachi processor will begin in January 1988 with monthly rental rates starting at 80 million yen. (Tokyo NIHON KEIZAI SHIMBUN 1 Jul 87) Andy R. X2726

..... *Continued on Page 1*

FEATURE ARTICLES

REPORTS

PERSPECTIVES selections are based solely on foreign press, books and journals, or radio and television broadcasts. Some of the materials used in this publication will appear as abstracts or translations in FBIS serial reports. Comments and queries regarding this publication may be directed to the Managing Editor (Craig M. [redacted] or to individuals at the numbers listed with items.

STAT

DEVELOPMENTS

DEVELOPMENTS highlights worldwide S&T events reported in the foreign media. Items followed by an asterisk will be published by FBIS. The contributor's name and telephone number are provided.

Agrotechnology

(Bulgaria/USSR) The Agriya chemical combine of Plovdiv and the Soviet Chemical Industry Association in Pervomaysk have signed an agreement in the area of crop protection chemicals. According to the Sofia daily RABOTNICHESKO DELO (17 Apr 87), this is the first direct agreement signed in the agrochemical sector between Bulgaria and the USSR. Government officials of the two countries have also met to discuss cooperation in the production of fertilizer and pesticides. (Vienna EAST EUROPEAN CHEMICAL MONITOR Data Base) Antwerp Unit/Sharon W. X2519

Aerospace

(West Europe) SEP's (European Propulsion Company) altitude-simulating test stand at Vernon has been shut down, halting acceptance testing of Ariane's HM7B third stage engine, designated as the flight unit for the V-19 launch. Cracks were detected in a boiler, which is part of the test stand vacuum pump system. SEP suspects the failure was the result of extreme test conditions for which the stand was not designed. The test stand is the only one of its kind in Europe, and SEP is evaluating whether to repair or replace it and how this will affect the launch schedule. Two short-duration ignition tests at simulated altitude remain for acceptance of the HM7B, and a decision is pending on the feasibility of these tests under ground-level conditions. The week of 7 September has been announced as the tentative date for the next Ariane launch. (Paris AIR & COSMOS 13 Jun 87) Sharon W. X2519/Arlene A., Ruth H. X2617

(West Europe) The cost of ESA's (European Space Agency) revamped Hermes program is now estimated at ECU4.534 billion through 1998—double the initial estimate. This cost will include the construction of two operational shuttles, Hermes 01 and 02, to be used for two initial technical qualification flights (the first unmanned and the second manned) in late 1997 and mid-1998. ESA also plans a Hermes qualification flight in early 1999 to demonstrate servicing of the Man-Tended Free Flyer, Pallas. The 1999 flight will cost an additional ECU474 million, bringing the program's total cost to ECU5 billion. (Paris AIR & COSMOS 13 Jun 87) Sharon W. X2519

Propfan Aircraft

(France) France's Aerospatiale has been studying the use of propfans in the AS 100, a 100-seat transport with a nominal range of 1,500 nautical miles and a speed of Mach .74 to .78 at 30,000 feet. Power plants under consideration include GE's Unducted Fan (UDF) and the propfan currently being developed by Pratt and Whitney, Allison, and Hamilton Standard. Introduction into service is projected for 1995. (Paris AIR & COSMOS 20 Jun 87) Sharon W. X2519

(FRG/International) The FRG's MBB is doing feasibility studies with CATIC (China Aero Technology Import and Export Corporation) of the PRC on the 60- to 85-seat MPC 75 propfan transport (scheduled for operation in the mid-1990s), which will have a range of 1,000 to 1,500 nautical miles at Mach .70 to .75 at an altitude of 35,000 feet. MBB is also working with Indonesia's IPTN, the Netherland's' Fokker, and Boeing on an 83 to 115-seat propfan designated the ATRA-90 (Advanced Technology Regional Aircraft), which will have a range of 1,500 to 2,100 nautical miles at Mach .8 at an altitude of 30,000 feet. The aircraft is slated for introduction between 1992 and 1995. (Paris AIR & COSMOS 20 Jun 87) Sharon W. X2519

Biotechnology

(Hungary) The Hungarian Government has expanded its direct financial investment in the Biotechnika biotechnology venture, whose original partners were the Szeged Biological Center of the Hungarian Academy of Sciences, the State Development Institute, and the Innofinance General Innovation Financial Institute. The Ministry of Industry, the National Technical Development Committee, and the Technova Industrial Development Bank have now joined the venture, bringing its operating capital to 244 million forints. The additional funds will be used in construction of laboratory facilities at Szeged. Biotechnika focuses on applied research and industrial applications of biotechnology. (Vienna EAST EUROPEAN CHEMICAL MONITOR Data Base Jun 87) Antwerp Unit/Sharon W. X2519

Computers

(PRC) A remote computer network information retrieval system, the first of its kind in China, has been developed by a research institute of the PLA General Staff Department and certified by a committee chaired by noted computer specialist and Chinese Academy of Sciences Technical Science Department member Ci Yungui. It is an interactive system which gives multiple users throughout the PLA the capability to create and query Chinese character data bases and share information over the mini-computer supported network. The network represents an important step in the establishment of an automated command network. (Beijing KEJI RIBAO 7 May 87) Henry V. X2779

Microelectronics

(France) At the recent Paris Air Show, Thomson-CSF exhibited its new airborne attack radar, the RDY. The heart of the RDY is a programmable signal processor (PSP) that has a processing capability of 100 million complex operations per second, the equivalent of five Cray 1 supercomputers working simultaneously. The PSP, however, will occupy a volume of only 1.34 cubic feet in the series production radar because it uses special integrated circuits developed in France's very high speed integrated circuits program (see PERSPECTIVES Vol. 2, No. 5 p 13). Second-generation VHSICs will further reduce the PSP's volume to .71 cubic feet. The second-generation version would be used in the ACT and ACM fighter programs, follow-ons to the Rafale. (Paris AIR & COSMOS 20 Jun 87)* Sharon W. X2519

Optical Materials

(USSR) Chemists at the Institute of General and Inorganic Chemistry of the Ukrainian Academy of Sciences (Kiev) have produced holograms by

photopolymerizing acrylamide monomers in aqueous gelatin films with an He-Ne laser. Formed on glass supports, the holograms have a maximum diffractive effectiveness of 33 percent, and researchers found that diffractive effectiveness varies with acrylamide concentration in the films. (Kiev UKRAINSKIY KHIMICHESKIY ZHURNAL May 87) Kris P. X2898

(USSR) Soviet chemists are studying a number of organic compounds as potential luminophores and scintillating compounds for application in optics such as detectors in particle accelerators. L. Sh. Afanasiadi and others at the All-Union NII of Monocrystals at the NPO "Monokristallreaktiv" in Kharkov have synthesized 12 new hetarylethylene derivatives of 2,5-diphenyloxazole and -oxadiazole-1,3,4, each containing a thiophene cycle. In testing the luminescent and scintillating properties, researchers found that the heavy sulfur atom in the thiophene cycle made the compounds less effective than other oxazole derivatives. (Riga KHIMIYA GETEROTSIKLICHESKIKH SOYEDINENIY Sep 86) Kris P. X2898

Rare Earth Semiconductor

(France) French CNET (National Center for Telecommunications Studies) researchers at Lannion reportedly are about to produce the first prototype semiconductor devices using the rare earth compound lutetium diphtalocyanine in place of silicon or gallium arsenide. Previous laboratory research has shown that, without doping, a thin film or monocrystal of lutetium diphtalocyanine exhibits conductivity similar to that of conventional semiconductors after doping. The compound can also be deposited by low-temperature sublimation over large surfaces as a homogeneous 500- to 1000-Angstrom thin film. (Paris LA RECHERCHE Jul-Aug 87) Antwerp Unit/Sharon W. X2519

Superconductivity

(USSR) A.R. Kaul of Moscow State University's (MGU) Chemistry Department recently revealed that MGU specialists are synthesizing new high-temperature superconductors. They formed a ring out of a complex superconducting oxide (not further identified) and activated circular current in it that remained constant for several hours. This allowed the chemists to measure the superconductor's specific resistance, which they found to be less than 10^{-11} Ohm·cm. (Moscow KHIMIYA I ZHIZN Jun 87) Kris P. X2898

(Greece) Using what was described as "modest" equipment, a researcher at the Dimokritos Institute has conducted experiments on a superconducting material (not further identified) resulting in a critical temperature of 90K. The Greek Government announced that the researcher (Mr. Niarkhos) will be placed in charge of a superconductivity research program to be funded from cuts in other R&D projects. (Athens I KATHIMERINI 1 Jul 87)* Rosa M. X2676

Telecommunications

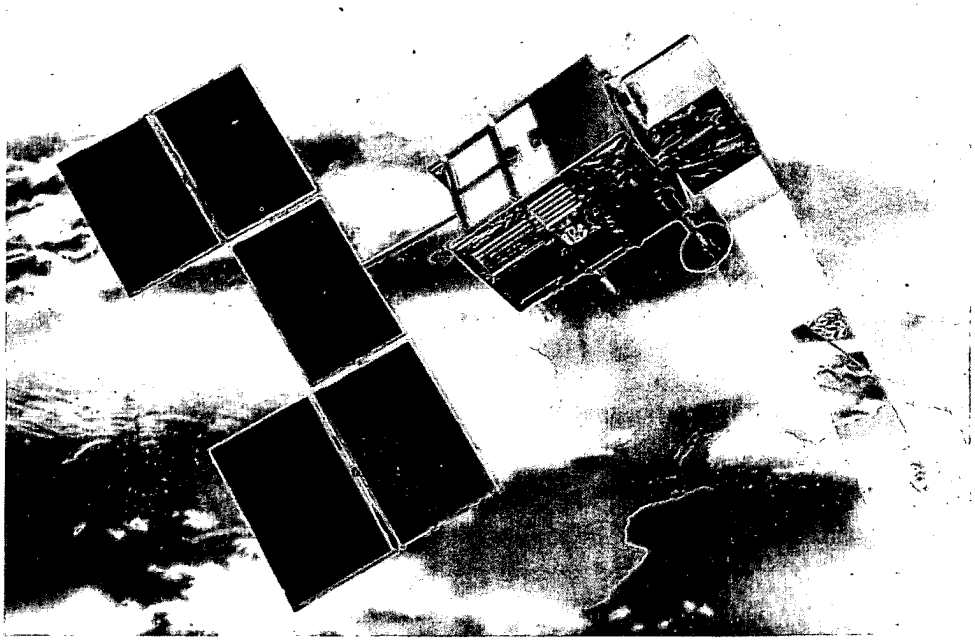
(Japan) In a joint venture, the Key Technology Center, the Tokyo Institute of Technology, and several private firms (including Hitachi and Oki Electric), have established the Satellite Communication System Application Development Company. The company, which is to receive 70 percent of its funding from the Key Technology Center, will specialize in the development of software for communication satellites and in the design of VSAT (very small aperture terminal) micro-earth stations. The company's first project will be software R&D and VSAT design for the CS-3 satellite (slated for launch in 1988), which will be equipped with 150 transponders. (Tokyo NIHON KOGYO SHIMBUN 20 May 87) Akiko S. X2726

FRANCE: MILITARY SATELLITE PROGRAM

Key Points: The French military has increased its cooperation with the civilian aerospace sector in the design and development of the Helios reconnaissance satellite system. This cooperation is geared to marshaling technical skills, streamlining management procedures, and reducing costs for a program that will take French military overhead reconnaissance into the 21st century, according to AIR & COSMOS (20 Jun).

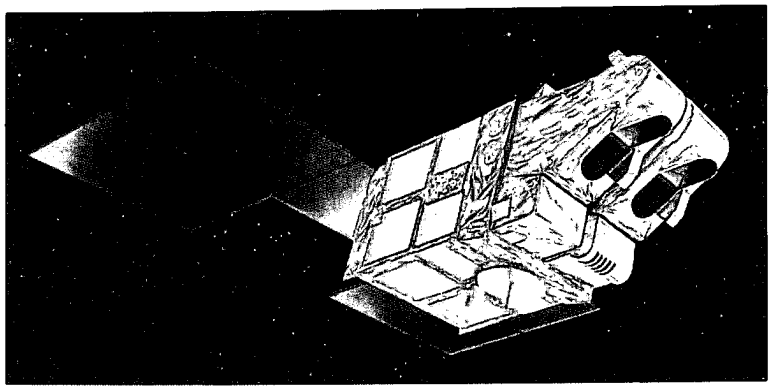
Early this year, the DGA (General Delegation for Armament) and the CNES (National Center for Space Studies) agreed to cooperate more fully in the ongoing development of the Helios and Spot satellite programs. This is the latest in a series of cooperative efforts between the designers of French military and civilian satellite systems. According to this agreement, the Helios program will be overseen by a steering commmittee under the General Deputy for Armament, who has designated the DEN (Missiles Directorate) as program director and the CNES as overall system manager. In addition to its allocations for reconnaissance satellite research, the DGA has funded about 30 percent of CNES' civilian Spot program.

In July 1986, at the request of the Ministry of Defense, the CNES proposed simplifications in the Helios system, eliminating nonessential features (not further identified) and linking the Spot 4 and Helios projects in an effort to reduce development costs. The proposals involved changes in satellite design and development as well as adjustments in project management to enhance coordination between the CNES and program contractors. Under these revised guidelines, work was initiated with a Helios design review slated for mid-1987.



Artist's conception of Helios reconnaissance satellite

Helios will use a new platform designed by the French aerospace firm Matra for the Spot 4 and 5 satellites. The satellite will have increased reliability, power, and operating life (three years). It will be equipped with a powerful CCD (charge coupled device) optical telescope with a 1-meter resolution, 10



Artist's conception of Spot 4 Earth observation satellite

times better than that of Spot. The satellite, which will weigh 2.5 tons, will be launched into an 800- to 900-kilometer sun-synchronous orbit. Launch of the first Helios satellite is scheduled for July 1993 aboard an Ariane 4. The French Government plans to launch three or four satellites to assure continuous service through the beginning of the next century.

The industrial manager for the Helios program will be Aerospatiale, which will be in charge of running the mission operations center. The image exploitation center will be built by Matra and SEP (European Propulsion Company). CNES will build the satellite control center in cooperation with Sat Control, a joint subsidiary of CNES, Matra, and Aerospatiale. Matra will be the prime contractor for the Helios satellites and, in conjunction with Alcatel-Espace, will build the telemetry and control systems. Aerospatiale will provide the solar generator, inertia wheels, and thermal control. Aerospatiale will also make the imaging equipment for the Helios satellites. The French firm Enertec will supply the magnetic recorder.

Sharon W. X2519

USSR: LASER MATERIALS R&D—SOLID STATE LASER CRYSTALS

Key Points: The Soviets are continually improving laser capabilities by upgrading component materials. In this first article of a two-part series on the chemistry behind Soviet laser R&D, advances in the synthesis and nonlinear wave propagation of lanthanide and metal oxide laser crystals are discussed using information from a number of Soviet chemistry journals. The second article, "Laser Materials R&D—Gas Laser Media," will appear in the next issue of PERSPECTIVES.

Chemists at four Soviet institutes have made important contributions to advances in lanthanide and metal oxide laser crystals over the past three years. Soviet research indicates that lanthanide-metal-oxides will have major applications in the miniaturization of lasers due to their ability to maintain the spacing of active centers even in high concentration. However, Soviet research on more traditional metal oxide crystals such as tellurium dioxides, alexandrites, pyrargyrite, and proustite will continue to play a significant role in nonlinear laser optics and acoustics. The unique structural properties exhibited by lanthanide-metal-oxides have made them particularly useful recently in the field of superconductivity.

Lanthanide Crystals

A team led by D. V. Bakin at the USSR Academy of Sciences' Institute of General and Inorganic Chemistry imeni N. S. Kurnakov (Moscow) studied 100 lanthanide-metal-oxide compounds as prospective nonlinear media for miniaturized solid state lasers. These neodymium phosphate, niobate, tantalate, and titanate oxide compounds will be useful in miniaturization because they can be highly concentrated without losing their luminescent or laser frequency-converting properties. In these new anisotropic crystals, the "micro-particles" (clusters of optical electrons required for laser frequency conversion) are localized in asymmetrically spaced metal-oxygen bonds, guaranteeing that the active centers (rare earth element polyhedrons) are widely spaced and that the Nd^{3+} ions are free to luminesce even in high concentrations. Lanthanum-neodymium titanotantalates and titanoniobates, especially $La_{0.8}Nd_{0.2}TiTaO_6$, exhibit the best laser and nonlinear optical properties, according to DOKLADY AKADEMII NAUK SSSR (Jan 87).

At the same institute, a group under Zh. A. Yezhova researched reactions of polyphosphate with rare earth element ions to synthesize new crystals for use in lasers, luminescent detectors, microelectronics, and optics. By reacting sodium polyphosphate with rare earth element chlorides and nitrates in aqueous solution, the chemists produced three groups of compounds and then studied their physico-chemical properties. Group I consisted of La and Ce (III) nitrates and Pr, Nd, and Gd chlorides where $NaPO_3$ - $Ce(NO_3)_3$-H_2O had the best properties; group II contained only $NaPO_3$-$EuCl_3$-H_2O; and group III consisted of Tb, Er, and Y chlorides. The authors assert that their success in synthesizing these new crystals will enable them to investigate the crystals' luminescent properties during photo and cathode excitation, according to ZHURNAL NEORGANICHESKOY KHIMII (Sep 86).

Metal Oxide Crystals

While studying tellurium dioxide-containing systems and phases as prospective materials for optics and acoustic optics, a team led by O. V. Sorokina at the Moscow Institute of Fine Chemical Technology imeni M. V. Lomonosov developed a new green crystal ($LiCrTeO_4$), according to ZHURNAL NEORGANICHESKOY KHIMII (Sep 86). They synthesized the crystal by slowly heating a carefully blended mixture of lithium carbonate and chromium (III) and tellurium (IV) oxides in stoichiometric amounts. At 370°C, lithium carbonate reacted with the tellurium dioxide, forming a material which melted at 450-500°C and turned into a green glass after cooling. When the glass was annealed at 600°C, Cr_2O_3 participated in the reaction, forming $LiCrTeO_4$, a green polycrystalline powder. At 930°C, $LiCrTeO_4$ returned to the solid phase.

A research team under V. N. Matrosov at the USSR Academy of Sciences' Experimental-Production Plant for Manufacturing Special Physics Instruments and Equipment NTO (Scientific-Technical Association) produced a new low-temperature modification of alexandrite (*beta*-$BeO{\cdot}Al_2O_3$) while studying the $BeO\text{-}Al_2O_3$ system as a prospective solid state laser crystal with a wavelength of 700-820 nanometers. The scientists obtained *beta*-$BeO{\cdot}Al_2O_3$, a transparent monocrystal, from a supercooled alexandrite melt, but as soon as they removed the crystal from the melt it turned into chrysoberyl, an opaque white form of alexandrite. The authors found that *beta*-$BeO{\cdot}Al_2O_3$ contains almost no chromium while chrysoberyl contains large amounts of the compound, according to DOKLADY AKADEMII NAUK BSSR (Oct 86).

Researchers at the Turkmenskiy Polytechnical Institute studied wave propagation in pyrargyrite (Ag_2SbS_3) and proustite (Ag_3AsS_3) monocrystals to determine their suitability for nonlinear optics and acoustic electronics. By inputting data on the piezoelectric and dielectric constants of pyrargyrite and proustite into a computer, a team led by Ya. A. Agayev was able to calculate angular relationships in phase velocity anisotropy, the coefficient of electromechanical connection, and elastic wave polarization for both crystals. The authors state that knowing these values will enable them to cut the crystals optimally for various applications, according to IZVESTIYA AKADEMII NAUK TURKMENSKOY SSR: SERIYA FIZIKO-TEKHNICHESKIKH, KHIMICHESKIKH, I GEOLOGICHESKIKH NAUK (Mar-Apr 87).

Kris P. X2898

USSR: MUON TOMOGRAPHY IN MINING

Key Points: Soviet scientists are focusing increased attention on the use of muon tomography in mine safety. Recent evidence of this effort appeared in the article "Muon Tomography of a Rock Massif," in the Soviet geophysical journal FIZIKA ZEMLI (No. 5, 1987) by V. M. Bondarenko. Earlier Soviet work on the use of muons in engineering geology, hydrology, and mining was published in V. M. Bondarenko's book NEW METHODS IN ENGINEERING GEOPHYSICS (Novyye metody inzhenernoy geofiziki, 1983), which devoted a chapter to "The Muon Method of Determining Rock Densities."

The Soviets have begun using muon tomography in selected coal mines to locate subterranean pockets of water that could pose a flood threat if intersected during mining operations. (For an examination of Soviet research in neutrino tomography, see PERSPECTIVES Vol. 1, No. 10 p 9.)

The muons are detected by a stack of four multichannel, multiwire, gas-filled radiation counters which allow the direction of the muon flux to be determined. Muons penetrating into the Earth lose their flux density as they ionize atoms in the soil, rocks and groundwater, until the flux is no longer detectable at about a 2 to 3-kilometer depth, which is below the working levels in most coal mines. This decrease in muon flux density can be related to the total density of the overlying mass of rock, soil, and groundwater. By taking measurements at numerous sites in a mine, a set of spatially distributed muon flux densities is obtained. Additional geophysical and geological data are combined with the muon flux data to obtain a three-dimensional density map of the overlying strata using mathematical methods of tomography. Areas of "anomalously" low densities in the three-dimensional density map are considered to be sites where natural processes (such as karst sinkholes and caves filled with rubble) or mining operations have produced areas of porous rock filled by water.

Density readings from muon tomography reportedly are as accurate as those provided by other geophysical methods (downhole gamma ray scattering tools and gravimetric surveys) long used by the Soviet coal mining industry.

Norman H. X2725

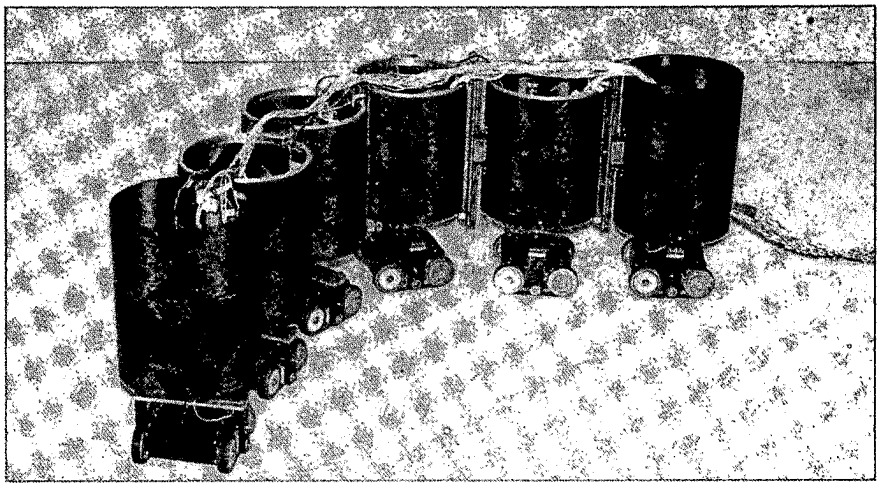
REPORTS

REPORTS surveys science and technology trends as detailed in articles, books, and journals. It also includes summaries and listings of articles and books which may serve as potential sources for future research. Conference proceedings will occasionally be presented in this section.

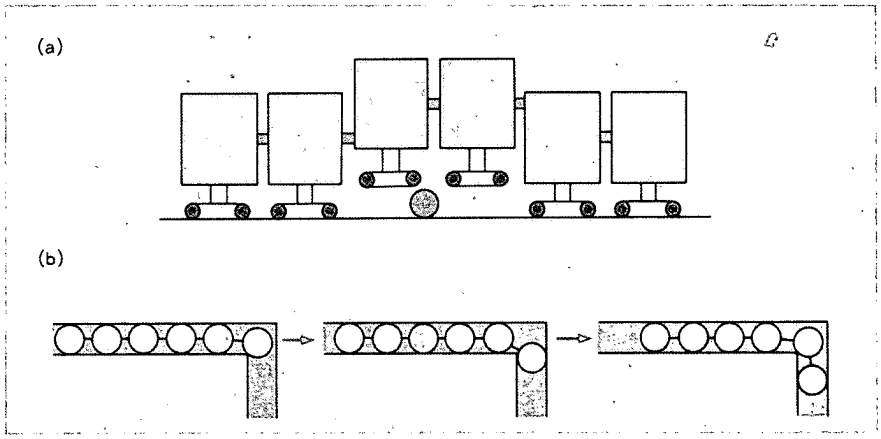
JAPAN: "MULTI-JOINT MOBILE ROBOT"

The Tokyo Institute of Technology has developed a prototype "vertical axis multi-joint mobile robot" for use in hazardous environments, according to April and May reports in the Tokyo press.

The robot, which moves at 4 kilometers/hour, weighs 27.8 kilograms, and has 16 degrees of freedom, is composed of six linked cylindrical units made of carbon reinforced plastic. An individual unit is 206 millimeters in diameter (which the institute plans to increase to 600 millimeters) and 400 millimeters in height. Each unit is equipped with two crawlers and three servomotors that allow horizontal, rotational (for turning), and vertical (for ascending/descending stairs or "jumping" over objects) movement. The robot has a loading capacity twice its own weight.



Multi-joint mobile robot



Key: a) Movement when a unit "jumps" over an object.
b) Movement when a unit turns a corner.

Akiko S. X2726

BULGARIA/UK: BIOTECHNOLOGY JOINT VENTURES

Bulgaria is carrying out several major biotechnology projects in close cooperation with West European, especially UK, pharmaceutical companies, according to the CPE BULLETIN (Feb-Mar 87). These joint projects are part of Bulgaria's avowed effort to develop East Europe's most advanced biotechnology industry. (For Bulgarian R&D programs in the agrochemical industry, see PERSPECTIVES Vol. 2, No. 10 pp 6-7.)

Since 1980, Bulgaria has permitted the formation of joint ventures with foreign firms using incentives such as favorable credit terms, tax discounts exceeding 20 percent, and allowing the foreign firm controlling interest.

In 1985, Bulgaria launched seven joint projects designed to emphasize the priority Sofia had given biotechnology research. The Bulgarian firm Bioinvest and the UK's APV International PLC opened the way by forming a pharmaceutical and food products company called APV-Bioinvest, in which APV controls 51 percent of the operating capital. In addition, Bioinvest, which specializes in genetic engineering and refermentation, has been negotiating with the UK firm Celltech to market monoclonal antibody diagnostic tests in CEMA countries under UK license. A joint venture also exists between the UK firm John Brown Engineers and Bulgaria's FTO Technika for an industrial enzyme project in Katuniza. (Other partners in joint Bulgarian ventures include Fanuc and Mitsukoshi of Japan and a US firm.)

Most recently, Bulgaria has intensified its efforts to attract UK partners during the 15th session of the UK-Bulgarian Joint Commission to promote collaborative ventures. According to the PHIND Data Base (Apr 87), Bulgaria "is seeking investment in 10 to 12 small- to medium-size enterprises for the production of synthetic medicines, monoclonal antibodies, insulin, ointments, and tablets."

Bulgarian achievements in biotechnology, according to the CPE BULLETIN, are outlined below:

— A patent for the production of glucose isomerase using Streptomyces culture.

— Production of immunoglobulins and betaglobulin for vaccines.

— The production of giant liposomes for use in various biotech processes.

— Two-dimensional electrophoresis, cell adhesion, and cell fusion in an electric field with radial symmetry.

— Establishment of twenty centers for embryo deep freeze and transplantation technology.

— A gene bank in Sadovo financed by the UN's Food and Agricultural Organization.

— Development of virus-free potatoes and fruit trees using in vitro cell cultures.

Antwerp Unit/Rita S. X2609

PREVIEWS

PREVIEWS is an annotated list of selected science and technology items being published by FBIS. The list may also contain previously published items of wide consumer interest.

SCIENCE & TECHNOLOGY: EUROPE & LATIN AMERICA REPORT

CHIEF OF NEW THOMSON-SGS FIRM ON R&D, MARKETING STRATEGY

Pasquale Pistorio, chief of the new Thomson-SGS firm United Semiconductors, is interviewed on his three-point strategy: continuation of current R&D efforts, optimization of production activities, and expansion of international marketing efforts. (Paris Supplement to ELECTRONIQUE ACTUALITIES No 884, Jun 87)

FRG ECONOMICS MINISTER SETS RULES FOR AIRBUS SUBSIDIES

Article details guidelines set by Economics Minister Martin Bangemann for Deutsche Airbus participation in the A 330/340 program. Repayment of some DM3 billion in loans between 1988 and 1996 is highlighted. (Bonn TECHNOLOGIE NACHRICHTEN-MANAGEMENT INFORMATIONEN 12 Jun 87)

STUTTGART UNIVERSITY-FRAUNHOFER ASSOCIATION BIOTECHNOLOGY PROJECT

Article outlines the role of each partner in this new FRG biotechnology engineering project. While Stuttgart University will concentrate on theoretical research, the Fraunhofer Association will test results and develop applications. (Bonn TECHNOLOGIE NACHRICHTEN-MANAGEMENT INFORMATIONEN 12 Jun 87)

PROBLEMS CONTINUE TO PLAGUE ARIANE THIRD-STAGE ENGINE

Although launch orders continue to be placed, article explains that technical difficulties and testing problems will delay resumption of Ariane launches. These third-stage engine problems will also affect Ariane 4. (Stuttgart FLUG REVUE Jun 87)

FRANCE'S ONERA PLANS NEW HYPERSONIC WIND TUNNEL

Article examines an arc-type wind tunnel designated F4 that is in the planning stages and will be used for Hermes tests. Its cost is estimated to be Fr50-60 million, plus Fr10-20 million for instrumentation. Talks are under way with CNES to refine details and study financing. (Paris AIR & COSMOS 13 Jun 87)

REDESIGNED ARIANE 5 PROPOSED FOR SERVICE IN 1996

Article outlines the revised design and performance figures for the new Ariane 5, gives a timetable for its development and introduction as well as phase-out of Ariane 4. It includes projected launch prices, payload figures, production costs, and launch frequencies. A separate section lists companies in charge of building specific components of the system. (Paris AIR & COSMOS 13 Jun 87)

MATRA: SEMICONDUCTOR LASER INTERSATELLITE LINK EXPERIMENT

Matra presented for the first time at the Paris Air Show its experimental intersatellite link system, SILEX, which will be tested in 1993 by one of the new European experimental telecommunications satellites. The article contains a brief description of the system, the technologies contributed by various subcontractors, how it will function, development costs, and operation dates. (Paris AIR & COSMOS 20 Jun 87)

AERITALIA "ST-3" STEALTH COMBAT AIRCRAFT R&D

Article describes Aeritalia's advanced research into the development of an ST-3 (STealth, STol, STand-off) combat aircraft which would be armed with weapons such as the Skyshark missile recently unveiled by the Aeritalia-SNIA consortium, CASMU. Aeritalia expects to have a full-scale technology demonstrator in the early 1990s. (Rome AIR PRESS 11 Jul 87)